MECHANICAL & MATERIAL COLLOQUIUM

Nanomaterials: Bridging Nanofabrication and Additive Manufacturing

by Daniela Radu (MME/FIU)

Nanoparticle precursors provide a versatile platform for scalable thin-film fabrication. By dispersing these nanoscale building blocks into liquid-based formulations, uniform coatings can be deposited over large areas using conventional methods such as spin, spray, or blade coating. This approach reduces cost and complexity while enabling thin films that are relevant to energy, electronics, and emerging manufacturing technologies. A key advantage of nanoparticle precursors is their reduced melting and sintering temperatures, often several hundred degrees below bulk materials, which allows crystalline, defect-minimized films to form on inexpensive substrates such as soda-lime glass or flexible polymers. Achieving dense and mechanically robust films requires precise control over particle size, distribution, and surface properties, which impact their adhesion, stability, and final microstructure. This presentation will highlight recent advances in processing thin films from nanoparticle precursors, with emphasis on how processing parameters influence structure and performance. It will conclude with new findings on two-dimensional nanomaterials, a promising materials class for next-generation thin-film technologies.

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Dr. Daniela Radu is a Professor and Interim Chair of the Department of Mechanical and Materials Engineering at FIU. She leads a substantial research portfolio focused on advanced functional nanomaterials. Her work explores applications across multiple strategic domains, including energy systems, space technologies, quantum science, and cutting-edge nanotechnology. Her interdisciplinary approach bridges fundamental materials science with practical applications addressing challenges in quiet energy generation technologies, novel thin film semiconductors and quantum photonics. Radu's contributions to space technology materials have attracted significant attention from NASA, while her quantum science research explores nanomaterial platforms for quantum sensing and information processing. Radu has established extensive collaborations with national laboratories, industry partners, and international research institutions, securing substantial external funding from NASA, DoD, DOE, NSF, and USDA. As the Interim Chair of the Mechanical and Materials Engineering Department at FIU, she seeks to expand partnerships and research portfolio to support FIU's strategic initiatives. Radu holds a Ph.D. in Chemistry from Iowa State University (Ames, IA) and has further completed a postdoctoral fellowship at Scripps Research (La Jolla, CA). Prior her academic appointments she has been a senior scientist at DuPont Central Research and Development where she pioneered research in nanoscale semiconductors. Radu authored over a hundred journal articles and conference proceedings, delivered numerous conference and seminar presentations, and holds five granted patents.

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EC 1113

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https://mme.fiu.edu/seminar-schedule

For questions or suggestions, contact Colloquium Organizers Dr. Jiuhua Chen (chenj@fiu.edu) or Dr. Pezhman Mardanpour (pmardanp@fiu.edu)